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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/454,318 | 11/04/1999 | Fen-Ren Chen | 45688-00002 | 3814 |

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EXAMINER

DOAN, THERESA T

ARTICLE PAPER NUMBER

2814

DATE MAILED: 05/20/2003

Please find below and or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/434,318

Applicant(s)

CHIEN ET AL.

Examiner

Theresa T Doan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____

DETAILED ACTION

Request for Continued Examination

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 04/25/03 has been entered. An action on the RCE follows.

The amendment filed on 04/25/03 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-5 and 8-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shakuda (U.S. 5,557,115) in view of Mori et al. (U.S. 6,169,363).

Regarding claims 1 and 6, Shakuda in figures 1-5 teaches a flip-chip light-emitting device, comprising:

a transparent substrate 3 comprising a main surface 3a and a surface opposite to the main surface 3b, wherein the surface opposite 3b to the main surface 3a is the

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light-emitting surface of the device (figure 1, column 4, lines 1-50 and column 6, lines 10-31);

a semiconductor stacked structure arranged over the main surface 3a of the transparent substrate 31 wherein the stacked structure comprises an n-type GaN-based III-V Group compound semiconductor layer 41 adjacent to the main surface 3a and a p-type GaN-based III-V Group compound semiconductor layer 62 adjacent to the n-type semiconductor layer (figure 1);

a first electrode 9 being in electrical contact with the n-type semiconductor layer 41; and

a second electrode 10 being in electrical contact with the p-type semiconductor layer 62;

wherein the second electrode 10 covers most of the outer surface of the p-type semiconductor layer 62 and is positioned opposite to the light-emitting surface of the substrate.

Shakuda does not explicitly teach the second electrode has good reflectivity of light. However, Shakuda further teaches that when the light is emitted toward the sub-mount 11, the directed light is reflected back on the sub-mount 11 for returning to the semiconductor chip 2 and for emitting from the tail surface 3b of the light permeable substrate 3 (column 6, lines 25-31). Therefore, it would have been obvious to form the second electrode 10 of Shakuda with a material having high reflectivity of light in order to increase the contrast and light emitting efficiency. Such known feature of forming a high-reflective electrode material (i.e.; aluminum, silver, ITO) on a bottom surface of a

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transparent substrate for reducing an electrode resistance and obtaining satisfactory luminance is taught by high reflective electrode (I) in figure 15B of Mori (also see column 8, lines 24-26 and column 13, lines 30-45).

Regarding claims 8 and 13, Shakuda teaches substantially the entire claimed structure, as applied to claims 1 and 6 above, except for a p-type and an n-type GaN of group compound semiconductor layer. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to switch the n or p-type GaN of group compound semiconductor layer in order to use the device in a particular application. Note that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

Regarding claims 2 and 9, Shakuda teaches in figure 1 the stacked structure further comprises an active layer 5 placed between the n-type semiconductor layer 41 and the p-type semiconductor layer 62.

Regarding claims 3 and 10, Shakuda further teaches an insulating layer 18 at least coated on the side surface of the stacked structure, a portion of the first electrode and a portion of the second electrode (see figure 8).

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Regarding claims 4-5 and 11-12, Shakuda teaches a base 16 that has a first 15a and second conductive portions 14 respectively connected to the first and second electrodes (9, 10); and the base 16 can be a conductive lead frame (see figure 5, column 5, lines 51-67).

4. Claims 7 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shakuda (5,557,115) and Mori et al. (U.S. 6,169,363) as applied to claims 1 and 8 and further in view of JP 03263878 A as previously cited.

Shakuda and More teach substantially the entire claimed structure, as applied to claims 1 and 8 above, except the second electrode is a multi-layer structure of (Ni/Au/Ti/Al), (ITO/Al) or (ITO/Ag). However, JP 03263878 A teaches in the abstract the second electrode 7 is made of (ITO/Ag) in order to obtain better reflectivity of light. Given the above teaching, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to use an electrode comprising (ITO/Ag) in Hanato et al.'s device as taught by JP 03263878 A for better reflectivity of light.

Response to Arguments

Applicant's arguments with respect to claims 1-14 have been considered but are moot in view of the new ground(s) of rejection.

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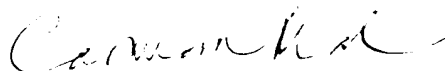
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Theresa T Doan whose telephone number is (703) 305-2366. The examiner can normally be reached on Monday to Thursday from Monday to Thursday from 8:00AM - 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, WAEL FAHMY can be reached on (703) 308-4918918. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

TD
May 9, 2003.


CAMELIA K. CAI
PRIMARY EXAMINER